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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/801,205

Applicant(s)

FARNWORTH ET AL.

Examiner

Eddie C. Lee

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-84 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-84 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>6/21/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1, 11, 15, 19, 22, 32, 34, 36, 40, 41, 42, 43, 57, 61, 62, 63, 64, 74, 76, 78, 82, 83 and 84 are rejected under 35 U.S.C. 102(e) as being anticipated by Doan et al.

Regarding claim 1, Doan discloses a semiconductor die (Fig. 3A, for example) having at least one circuit connected to at least one component (para [0033]) comprising: a semiconductor die having an active surface (144), an inactive surface (152) and at least one circuit (para [0039]): at least one bond pad (142 of Fig. 3B) formed on a portion of the active surface; and at least one bond pad (150) formed on a

portion of the inactive surface of the semiconductor die. Doan discloses a device wherein at least one bond pad formed on a portion of the inactive surface of the semiconductor die is capable of being used for protecting a portion of the semiconductor die. The limitation "for protecting a portion of the semiconductor die" is considered to be functional language which does not patentably distinguish the claimed invention from Doan. Furthermore, the limitation "by placing the at least one bond pad on a portion of the inactive surface of the semiconductor die distributing the forces therearound" merely restates limitation previously recited the claim.

Regarding claim 11, Doan discloses a semiconductor die (Fig. 3A) further comprising: at least one resilient connector (148, para [0039]) attached to a portion of the active surface (144) of the semiconductor die and a portion of a surface of a substrate (para [0015]).

Regarding claim 15, Doan discloses a semiconductor die (Fig. 3B) wherein the semiconductor die includes at least a portion of one metal protection layer (146) located on a portion of the active surface (144) of the semiconductor die.

Regarding claim 19, Doan discloses a semiconductor die (Fig. 3B) wherein the semiconductor die includes a portion of at least one metal protection layer (146) having a portion thereof located adjacent an edge of the semiconductor die.

Regarding claim 22, Doan discloses a semiconductor die (Fig. 3A) having at least one circuit connected to at least one component (para [0033]) and a substrate (para [0015]) comprising: a semiconductor die having an active surface (144), an inactive surface (152) and at least one circuit (para [0039]), the semiconductor die

including at least one bond pad (112 of Fig. 2A) formed on a portion of the active surface thereof connected to the at least one circuit and at least one bond pad (150) formed on a portion of the inactive surface; and a substrate (para [0015]) having a portion thereof connected to the at least one bond pad formed on the portion of the active surface of the semiconductor die (para [0040]). Furthermore, the limitation "by placing the at least one bond pad on a portion of the inactive surface of the semiconductor die distributing the forces therearound" merely restates limitation previously recited the claim.

Doan discloses a device wherein at least one bond pad formed on a portion of the inactive surface of the semiconductor die is capable of being used for protecting a portion of the semiconductor die. Additionally, the limitation "for protecting a portion of the semiconductor die" is considered to be functional language, as discussed above.

Regarding claim 32, Doan discloses a semiconductor die (Fig. 3A) and substrate (para [0015]) further comprising: at least one resilient connector (148, para [0039]) attached to a portion of the active surface (144) of the semiconductor die and a portion of a surface of the substrate (para [0015]).

Regarding claim 34, Doan discloses a semiconductor die (Fig. 3A) and substrate (para [0015]) wherein the at least one resilient connector (148, para [0039]) includes a circular shape.

Regarding claim 36, Doan discloses a semiconductor die (Fig. 3B) and substrate (para [0015]) wherein the semiconductor die includes at least a portion of one metal

protection layer (146) located on a portion of the active surface of the semiconductor die.

Regarding claim 40, Doan discloses a semiconductor die (Fig. 3B) and substrate (para [0015]) wherein the semiconductor die includes a portion of at least one metal protection layer (146) having a portion thereof located adjacent an edge of the semiconductor die.

Regarding claim 41, Doan discloses a semiconductor die (Fig. 3A) and substrate (para [0015]). Doan does not explicitly state "wherein the semiconductor die includes at least one trace extending from at least a portion of the at least one bond pad formed on the portion of the active surface of the semiconductor die." However, it is inherent that a trace extends from at least a portion of the at least one bond pad (112 of Fig. 2A) formed on the portion of the active surface (144 of Fig. 3A) of the semiconductor die since such a trace is necessary to operate the input/output terminals of the device of Doan.

Regarding claim 42, Doan discloses a semiconductor die (Fig. 3A) and substrate (para [0015]) further comprising at least one connector (148, para [0039]) located on a portion of the at least one trace.

Regarding claim 43, Doan discloses a method comprising: forming an area of metal (150) on a surface of the semiconductor die (Fig. 3A), and "placing at least one bond pad (150) on an inactive surface of the semiconductor die." The language of "distributing the forces therearound and protecting at least a portion of the

semiconductor die" is merely functional language that does not structurally distinguish the claimed invention from Doan.

Doan discloses a method wherein formed an area of metal on a surface of the semiconductor die is capable of being used for protecting a portion of the semiconductor die. Additionally, the limitations "of relieving forces on a semiconductor die... for protecting a portion of the semiconductor die" is considered to be functional language, as discussed above.

Regarding claim 57, Doan discloses a method (para [0040]) wherein the semiconductor die (Fig. 3B) includes at least a portion of one metal protection layer (146) located on a portion of an active surface (144) thereof.

Regarding claim 61, Doan discloses a method (para [0040]), wherein the semiconductor die (Fig. 3B) includes a portion of at least one metal protection layer (146) located adjacent an edge of the semiconductor die.

Regarding claim 62, Doan discloses a method (para [0040]). Doan does not explicitly state "wherein the semiconductor die includes at least one trace extending from at least a portion of the area of metal formed on the surface of the semiconductor die." However, it is inherent that a trace extends from at least a portion of the area of metal (112 of Fig. 2A) formed on the portion of the active surface (144) of the semiconductor die (Fig. 3A) since such a trace is necessary to operate the input/output terminals of the device of Doan.

Regarding claim 63, Doan discloses a method (para [0040]) further comprising at least one connector (148 of Fig. 3B). Doan does not explicitly state "located on a portion

of the at least one trace." However, it is inherent that at least one connector is located on a portion of the at least one trace since such a trace is necessary to operate the input/output terminals of the device of Doan.

Regarding claim 64, Doan discloses a method (para [0040]) of forming a semiconductor die (Fig. 3A) having at least one circuit connected to at least one component (para [0039]) and a substrate (para [0015]) comprising: providing a semiconductor die having an active surface (144) and an inactive surface (152), the semiconductor die including at one bond pad (112 of Fig. 2A) formed on a portion of the active surface connected to one circuit and one bond pad (150) formed on a portion of the inactive surface; and attaching a substrate (para [0015]) having a portion thereof connected to one bond pad formed on the portion of the active surface of the semiconductor die. Furthermore, the limitation "by placing the at least one bond pad on a portion of the inactive surface of the semiconductor die distributing the forces therearound" merely restates limitation previously recited the claim.

Doan discloses a method wherein formed an area of metal on a surface of the semiconductor die is capable of being used for protecting a portion of the semiconductor die. Additionally, the limitation "of relieving forces on a semiconductor die... for protecting a portion of the semiconductor die" is considered to be functional language, as discussed above.

Regarding claim 74, Doan discloses a method (para [0040]) further comprising: attaching at least one resilient connector (148 of Fig. 3A, para [0039]) to a portion of the

active surface (144) of the semiconductor die and a portion of a surface of the substrate (para [0015]).

Regarding claim 76, Doan discloses a method (para [0040]), wherein the at least one resilient connector (148 of Fig. 3A, para [0039]) includes a circular shape.

Regarding claim 78, Doan discloses a method (para [0040]) wherein the semiconductor die (Fig. 3B) includes at least a portion of one metal protection layer (146) located on a portion of the active surface (144) thereof.

Regarding claim 82, Doan discloses a method (para [0040]) wherein the semiconductor die (Fig. 3B) includes a portion of at least one metal protection layer (146) located adjacent an edge thereof.

Regarding claim 83, Doan discloses a method (para [0040]). Doan does not explicitly state "wherein the semiconductor die includes at least one trace extending from at least a portion of the area of metal formed on the surface of the semiconductor die." However, it is inherent that a trace extends from at least a portion of the area of metal (112 of Fig. 2A) formed on the portion of the active surface (144) of the semiconductor die (Fig. 3A) since such a trace is necessary to operate the input/output terminals of the device of Doan.

Regarding claim 84, Doan discloses a method (para [0040]) further comprising at least one connector (148 of Fig. 3A, para [0039]). Doan does not explicitly state "located on a portion of the at least one trace." However, it is inherent that a connector is located on a portion of the at least one trace since such a trace is necessary to provide electrical connection from the connector to the die of the device of Doan.

Claims 1-2, 5-9, 12, 20-23, 26-30, 33, 41, 43, 44, 46, 49-53, 55, 62, 64-65, 68-72 and 75 are rejected under 35 U.S.C. 102(b) as being anticipated by Fang et al.

Regarding claim 1, Fang discloses a semiconductor die (312 of Fig. 3, for example) having at least one circuit connected to at least one component comprising: a semiconductor die (312) having an active surface (para (0016)), an inactive surface (para [0016]) and at least one circuit: at least one bond pad (para I0005J) formed on a portion of the active surface; and at least one bond pad (3121) formed on a portion of the inactive surface of the semiconductor die.

Fang discloses a device wherein at least one bond pad formed on a portion of the inactive surface of the semiconductor die is capable of being used for protecting a portion of the semiconductor die. The limitation "for protecting a portion of the semiconductor die" is considered to be functional language which does not patentably distinguish the claimed invention from Fang. Furthermore, the limitation "by placing the at least one bond pad on a portion of the inactive surface of the semiconductor die distributing the forces therearound" merely restates limitation previously recited the claim.

Regarding claim 2, Fang discloses a semiconductor die (Fig. 3) wherein the at least one bond pad (3121) formed on the portion of the inactive surface (para [0016]) of the semiconductor die (312) includes a bond pad connected to the at least one circuit of the semiconductor die (para [0016]).

Regarding claim 5, Fang discloses a semiconductor die (Fig. 3) further comprising: a substrate (35) having a portion thereof connected to the at least one bond pad (para [0005]) formed on the portion of the active surface (para [0016]) of the semiconductor die (312), the substrate having at least one circuit connected to the at least one bond pad formed on the active surface of the semiconductor die; and at least one bond wire (33) connected to the at least one pad (3121) formed on the portion of the inactive surface (para [0016]) of the semiconductor die.

Regarding claim 6, Fang discloses a semiconductor die (Fig. 3) wherein the substrate (35) includes a portion thereof located adjacent at least one edge of the semiconductor die (312).

Regarding claim 7, Fang discloses a semiconductor die (Fig. 3) further comprising a sealant material (36) located between a portion of the semiconductor die (312) and a portion of the substrate (35).

Regarding claim 8, Fang discloses a semiconductor die (Fig. 3) further comprising a sealant material (36) located along a portion of at least one edge of the semiconductor die (312) and a portion of the substrate (35).

Regarding claim 9, Fang discloses a semiconductor die (Fig. 3) wherein a bond pad (para [0005]) formed on the portion of the active surface (para [0016]) is connected to a contact pad (39) on a portion of a surface of the substrate (35).

Regarding claim 12, Fang discloses a semiconductor die (Fig. 3) wherein one bond pad (3121) formed on the portion of the inactive surface (para [0016]) of the semiconductor die includes a rectangular shape (3121c of Fig. 4).

Regarding claim 20, Fang discloses a semiconductor die (Fig. 3). Fang does not explicitly state "wherein the semiconductor die includes at least one trace extending from at least a portion of the at least one bond pad formed on the portion of the active surface of the semiconductor die." However, it is inherent that a trace extends from at least a portion of the at least one bond pad (para [0005]) formed on the portion of the active surface (para [0016]) of the semiconductor die since such a trace is necessary to operate the input/output terminals of the device of Fang.

Regarding claim 21, Fang discloses a semiconductor die (Fig. 3) further comprising at least one connector (3122) located on a portion of the at least one trace. However, it is inherent that at least one connector is located on a portion of the at least one trace of the semiconductor die since such a trace is necessary to operate the input/output terminals of the device of Fang.

Regarding claim 22, Fang discloses a semiconductor die (Fig. 3) having at least one circuit connected to at least one component and a substrate (35) comprising: a semiconductor die having an active surface (para [0016]), an inactive surface (para [0016]) and at least one circuit, the semiconductor die (312) including at least one bond pad (para [0005]) formed on a portion of the active surface (para [0016]) thereof connected to the at least one circuit and at least one bond pad (3121) formed on a portion of the inactive surface (para [0016]), and a substrate (35) having a portion thereof connected to the at least one bond pad formed on the portion of the active surface of the semiconductor die.

Fang discloses a device wherein at least one bond pad formed on a portion of the inactive surface of the semiconductor die is capable of being used for protecting a portion of the semiconductor die. The limitation "for protecting a portion of the semiconductor die" is considered to be functional language, as discussed above. Furthermore, the limitation "by placing the at least one bond pad on a portion of the inactive surface of the semiconductor die distributing the forces therearound" merely restates limitation previously recited the claim.

Regarding claim 23, Fang discloses a semiconductor die (312 of Fig. 3) and substrate (35) wherein one bond pad (3121) formed on the portion of the inactive surface (para [0016]) of the semiconductor die includes a bond pad connected to the at least one circuit of the semiconductor die.

Regarding claim 26, Fang discloses a semiconductor die (312 of Fig. 3) and substrate (35) further comprising: at least one bond wire (32) connected to the at least one bond pad (3121) formed on the portion of the inactive surface (para [0016]) of the semiconductor die.

Regarding claim 27, Fang discloses a semiconductor die (312 of Fig. 3) and substrate (35) wherein the substrate includes a portion thereof located adjacent at least one edge of the semiconductor die.

Regarding claim 28, Fang discloses a semiconductor die (312 of Fig. 3) and substrate (35) further comprising a sealant material (36) located between a portion of the semiconductor die and a portion of the substrate.

Regarding claim 29, Fang discloses a semiconductor die (312 of Fig. 3) and substrate (35) further comprising a sealant material (36) located along a portion of at least one edge of the semiconductor die and a portion of the substrate.

Regarding claim 30, Fang discloses a semiconductor die (312 of Fig. 3) and substrate (35) wherein one bond pad (para [0005]) formed on the portion of the active surface (para [0016]) is connected to a contact pad (39) on a portion of a surface of the substrate.

Regarding claim 33, a semiconductor die (312 of Fig. 3) and substrate (35) wherein one bond pad (3121) formed on the portion of the inactive surface (para [0016]) of the semiconductor die includes a rectangular shape (3121c of Fig. 4).

Regarding claim 41, Fang discloses a semiconductor die (312 of Fig. 3) and substrate (35). While Fang does not explicitly state "wherein the semiconductor die includes at least one trace extending from at least a portion of the at least one bond pad formed on the portion of the active surface of the semiconductor die." It is inherent that a trace extends from at least a portion of the at least one bond pad (para [0005]) formed on the portion of the active surface (para [0016]) of the semiconductor die since such a trace is necessary to operate the input/output terminals of the device of Fang.

Regarding claim 43, Fang discloses a method (para [0016]) comprising: forming an area of metal (para [0005]) on a surface of the semiconductor die (312 of Fig. 3), and "placing at least one bond pad (3121) on an inactive surface of the semiconductor die." The language of "distributing the forces therearound and protecting at least a portion of

the semiconductor die" is merely functional language that does not structurally distinguish the claimed invention from Fang.

Fang discloses a method wherein formed an area of metal on a surface of the semiconductor die is capable of being used for protecting a portion of the semiconductor die. Additionally, the limitations "of relieving forces on a semiconductor die...for protecting a portion of the semiconductor die" is considered to be functional language, as discussed above.

Regarding claim 44, Fang discloses a method (para [0016]) further comprising; providing a substrate (35 of Fig. 3); connecting the area of metal (para [0005]) to a portion of the substrate. Fang does not explicitly state "and applying a force between the substrate and the area of metal." However, it is inherent that force must be applied between the substrate and the area of metal since the bumps to which area of metal is connected is welded to the substrate (para [0005]).

Regarding claim 46, Fang discloses a method (para [0016]) wherein the area of metal comprises one bond pad (3121 of Fig. 3) formed on a portion of an inactive surface (para [0016]) of the semiconductor die connected to a circuit of the semiconductor die.

Regarding claim 49, Fang discloses a method (para [0016]) further comprising: forming a substrate (35 of Fig. 3) having a portion thereof connected to one bond pad (3121) formed on a portion of the inactive surface (para [0016]) of the semiconductor die (312), the substrate having at least one circuit connected to the at least one bond

pad of the semiconductor die; and at least one bond wire (32) connected to the at least one bond pad formed on the inactive surface of the semiconductor die.

Regarding claim 50, Fang discloses a method (para [0016]) wherein the substrate (35 of Fig. 3) includes a portion thereof located adjacent at least one edge of the semiconductor die.

Regarding claim 51, Fang discloses a method (para [0016]) further comprising applying a sealant material (36 of Fig. 3) located between a portion of the semiconductor die and a portion of the substrate (35).

Regarding claim 52, Fang discloses a method (para [0016]) further comprising applying a sealant material (36 of Fig. 3) located along a portion of at least one edge of the semiconductor die and a portion of the substrate.

Regarding claim 53, Fang discloses a method (para [0016]) further comprising: connecting one bond pad (3121 of Fig. 3) formed on the inactive surface (para [0016]) to a contact pad (39) on a portion of a surface of the substrate (35).

Regarding claim 55, Fang discloses a method (para [0016]) wherein one bond pad (3121 of Fig. 3) formed on the inactive surface (para [0016]) of the semiconductor die (312) includes a rectangular shape (3121c of Fig. 4).

Regarding claim 62, Fang discloses a method (para [0016]). Fang does not explicitly state "wherein the semiconductor die includes at least one trace extending from at least a portion of the area of metal formed on the surface of the semiconductor die." However, it is inherent that a trace extends from at least a portion of at least a portion of the area of metal (para [0005]) formed on the surface (para [0016]) of the

semiconductor die (312 of Fig. 3) since such a trace is necessary to operate the input/output terminals of the device of Fang.

Regarding claim 64, Fang discloses a method (para [0016]) of forming a semiconductor die (312 of Fig. 3) having at least one circuit connected to at least one component and a substrate (35) comprising: providing a semiconductor die having an active surface and an inactive surface (para [0016]), the semiconductor die including at least one bond pad (para [0005]) formed on a portion of the active surface connected to one circuit and one bond pad (3121) formed on a portion of the inactive surface; and attaching a substrate (35) having a portion thereof connected to one bond pad formed on the portion of the active surface of the semiconductor die.

Fang discloses a method wherein at least one bond pad formed on a portion of the inactive surface of the die is capable of being used for protecting a portion of the semiconductor die. The limitation "of relieving forces on a semiconductor die " is considered to be functional language, as discussed above. Furthermore, the limitation "by placing the at least one bond pad on a portion of the inactive surface of the semiconductor die distributing the forces therearound" merely restates limitation previously recited the claim.

Regarding claim 65, Fang discloses a method (para [0016]) wherein one bond pad (3121 of Fig. 3) formed on the portion of the inactive surface (para [0016]) of the semiconductor die includes a bond pad (para [0005]) connected to a circuit of the semiconductor die (312).

Regarding claim 68, Fang discloses a method (para [0016]) further comprising: connecting one bond wire (32 of Fig. 3) to the at least one bond pad (3121) formed on the inactive surface (para [0016]) of the semiconductor die (312).

Regarding claim 69, Fang discloses a method (para [0016]) wherein the substrate (35 of Fig. 3) includes a portion thereof located adjacent at least one edge of the semiconductor die (312).

Regarding claim 70, Fang discloses a method (para [0016]) further comprising applying a sealant material (36 of Fig. 3) located between a portion of the semiconductor die (312) and a portion of the substrate (35).

Regarding claim 71, Fang discloses a method (para [0016]) further comprising applying a sealant material (36 of Fig. 3) located along a portion of at least one edge of the semiconductor die (312) and a portion of the substrate (35).

Regarding claim 72, Fang discloses a method (para [0016]) further comprising: connecting the one bond pad (para [0005]) formed on the portion of the active surface (para [0016]) of the semiconductor die (312 of Fig. 3) to a contact pad (39) on a portion of a surface of the substrate (35).

Regarding claim 75, Fang discloses a method (para [0016]) wherein one bond pad (3121 of Fig. 3) formed on the inactive surface (para [0016]) of the semiconductor die (312) includes a rectangular shape (3121c of Fig. 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10, 13, 14, 31, 35, 54, 56 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang as applied to claims 1, 22, 43 and 64 above, and further in view of Doan.

Regarding claim 10, Fang discloses the limitations of claim 5. Fang does not disclose "a semiconductor die further comprising: at least one resilient connector attached to a portion of the active surface of the semiconductor die and a portion of a surface of the substrate." Doan discloses a semiconductor die (Fig. 3A) further comprising: at least one resilient connector (148) attached to a portion of the active surface (144) of the semiconductor die and a portion of a surface of the substrate (para [0015]). It would have been obvious to one of ordinary skill in the art to include resilient connectors in the invention of Fang since the bumps of the invention of Fang may comprise any material including the material which comprises resilient connectors as disclosed by applicant.

Regarding claim 13, Fang and Doan disclose the limitations of claim 10. Furthermore, Fang discloses a semiconductor die (Fig. 3) wherein the at least one bump includes a circular shape. If the proposed modification had been made to the invention of Fang, the resilient connections would have a circular shape.

Regarding claim 14, Fang discloses the limitations of claim 5. Fang does not disclose "wherein the substrate includes at least one resilient connector located on a surface thereon abutting a portion of the semiconductor die." Doan discloses a die (Fig. 3A) wherein the substrate (para [0015]) includes at least one resilient connector (148, para [0039]) located on a surface thereon abutting a portion of the semiconductor die. It would have been obvious to one of ordinary skill in the art to include resilient connectors abutting a portion of the semiconductor die in the invention of Fang since the bumps of the invention of Fang may comprise any material including the material for the resilient connectors as disclosed by the applicant. Moreover, Fang discloses bumps (3122 of Fig. 3) abutting a portion of the semiconductor die as shown above.

Regarding claim 31, Fang discloses the limitations of claim 26. Fang does not disclose "a semiconductor die further comprising: at least one resilient connector attached to a portion of the active surface of the semiconductor die and a portion of a surface of the substrate." Doan discloses a semiconductor die (Fig. 3A) further comprising: at least one resilient connector (148) attached to a portion of the active surface (144) of the semiconductor die and a portion of a surface of the substrate (para [0015]). It would have been obvious to one of ordinary skill in the art to include resilient connectors in the invention of Fang since the bumps of the invention of Fang may comprise any material including the material which comprises resilient connectors as disclosed by applicant.

Regarding claim 35, Fang discloses the limitations of claim 26. Fang does not disclose "wherein the substrate includes at least one resilient connector located on a

surface thereon abutting a portion of the semiconductor die." Doan discloses a die (Fig. 3A) wherein the substrate (para [0015]) includes at least one resilient connector (148, para [0039]) located on a surface thereon abutting a portion of the semiconductor die. It would have been obvious to one of ordinary skill in the art to attach resilient connectors abutting a portion of the semiconductor die in the invention of Fang since the bumps of the invention of Fang may comprise any material including the material for the resilient connectors as disclosed by the applicant. Moreover, Fang discloses bumps (3122 of Fig. 3) abutting a portion of the semiconductor die as shown above.

Regarding claim 54, Fang discloses the limitations of claim 49. Fang does not disclose "a method further comprising: attaching at least one resilient connector to a portion of the active surface of the semiconductor die and a portion of a surface of the substrate." Doan discloses a method (para [0040]) further comprising: attaching at least one resilient connector (148 of Fig. 3A) to a portion of the active surface (144) of the semiconductor die and a portion of a surface of the substrate (para [0015]). It would have been obvious to one of ordinary skill in the art to attach resilient connectors in the invention of Fang since the bumps of the invention of Fang may comprise any material including the material which comprises resilient connectors as disclosed by applicant.

Regarding claim 56, Fang discloses the limitations of claim 49. Fang does not disclose "wherein the substrate includes at least one resilient connector located on a surface thereon abutting a portion of the semiconductor die." Doan discloses a method (para [0040]) wherein the substrate (para [0015]) includes at least one resilient connector (148, para [0039]) located on a surface thereon abutting a portion of the

semiconductor die. It would have been obvious to one of ordinary skill in the art to include resilient connectors abutting a portion of the semiconductor die in the invention of Fang since the bumps of the invention of Fang may comprise any material including the material for the resilient connectors as disclosed by the applicant. Moreover, Fang discloses bumps (3122 of Fig. 3) abutting a portion of the semiconductor die as shown above.

Regarding claim 77, Fang discloses the limitations of claim 68. Fang does not disclose "wherein the substrate includes at least one resilient connector located on a surface thereon abutting a portion of the semiconductor die." Doan discloses a method (para [0040]) wherein the substrate (para [0015]) includes at least one resilient connector (148, para [0039]) located on a surface thereon abutting a portion of the semiconductor die. It would have been obvious to one of ordinary skill in the art to include resilient connectors abutting a portion of the semiconductor die in the invention of Fang since the bumps of the invention of Fang may comprise any material including the material for the resilient connectors as disclosed by the applicant. Moreover, Fang discloses bumps (3122 of Fig. 3) abutting a portion of the semiconductor die as shown above.

Claims 3-4, 24-25, 47-48 and 66-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang as applied to claims 1, 22, 43 and 64 above, and further in view of Chu et al. (US 20040099961), hereinafter Chu.

Regarding claim 3, Fang discloses the limitations of claim 1. Fang does not disclose "wherein the at least one bond pad formed on the portion of the inactive surface includes a bond pad having more than one layer of material." Chu discloses (Fig. 6B, for example) a bond pad (35) having more than one layer of material (35c, para [0032]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include bond pads of more than one layer in the invention of Fang in order to prevent oxidation of the bond pads.

Regarding claim 4, Fang and Chu disclose the limitations of claim 3. Moreover, Chu discloses a bond pad having more than one layer of material, each layer of material comprising a different metal (para [0032]). It is inherent that the different metal materials, specifically copper and gold, have different coefficients of thermal expansion.

Regarding claim 24, Fang discloses the limitations of claim 22. Fang does not disclose "wherein the at least one bond pad formed on the portion of the inactive surface includes a bond pad having more than one layer of material." Chu discloses (Fig. 6B, for example) a bond pad (35) having more than one layer of material (35c, para [0032]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include bond pads of more than one layer in the invention of Fang in order to prevent oxidation of the bond pads.

Regarding claim 25, Fang and Chu disclose the limitations of claim 24. Moreover, Chu discloses a bond pad having more than one layer of material, each layer of material comprising a different metal (para [0032]). It is inherent that the different metal materials, specifically copper and gold, have different coefficients of thermal expansion.

Regarding claim 47, Fang discloses the limitations of claim 46. Fang does not disclose "wherein the at least one bond pad formed on a portion of the inactive surface includes a bond pad having more than one layer of material." Chu discloses (Fig. 6B, for example) a bond pad (35) having more than one layer of material (35c, para [0032]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include bond pads of more than one layer in the invention of Fang in order to prevent oxidation of the bond pads.

Regarding claim 48, Fang and Chu disclose the limitations of claim 47. Moreover, Chu discloses a bond pad having more than one layer of material, each layer of material comprising a different metal (para [0032]). It is inherent that the different metal materials, specifically copper and gold, have different coefficients of thermal expansion.

Regarding claim 66, Fang discloses the method of claim 64. Fang does not disclose "wherein the at least one bond pad formed on the portion of the inactive surface includes a bond pad having more than one layer of material." Chu discloses (Fig. 6B, for example) a bond pad (35) having more than one layer of material (35c, para [0032]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include bond pads of more than one layer in the invention of Fang in order to prevent oxidation of the bond pads.

Regarding claim 67, Fang and Chu disclose the method of claim 66. Moreover, Chu discloses a bond pad having more than one layer of material, each layer of material comprising a different metal (para [0032]). It is inherent that the different metal materials, specifically copper and gold, have different coefficients of thermal expansion.

Claims 66 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doan as applied to claim 64 above, and further in view of Chu.

Regarding claim 66, Doan discloses the method of claim 64. Doan does not disclose "wherein the at least one bond pad formed on the portion of the inactive surface includes a bond pad having more than one layer of material." Chu discloses (Fig. 6B, for example) a bond pad (35) having more than one layer of material (35c, para [0032]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include bond pads of more than one layer in the invention of Doan in order to prevent oxidation of the bond pads.

Regarding claim 73, Doan and Chu disclose the method of claim 66. Moreover, Doan discloses attaching at least one resilient connector (148, para [0039]) to a portion of the active surface (144) of the semiconductor die (Fig. 3A) and a portion of a surface of the substrate (para [0015]).

Claims 16-18, 37-39, 45, 58-60 and 79-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doan as applied to claims 1, 22, 43 and 64 above, and further in view of Kuo et al. (US 20050121804), hereinafter Kuo.

Regarding claim 16, Doan discloses the limitations of claim 1. Doan does not disclose "wherein the semiconductor die includes a first passivation layer located on a portion thereof and a second passivation layer located on a portion of the first

passivation layer." Kuo discloses a semiconductor die (100 of Fig. 1F, for example) which includes a first passivation layer (192c) located on a portion thereof and a second passivation layer (192d) located on a portion of the first passivation layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a second passivation layer located on a portion of a first passivation layer located on the die of the invention of Doan since it is desirable to eliminate moisture and static charge build up due to ambient interference.

Regarding claim 17, Doan discloses the limitations of claim 1, wherein the semiconductor die (Fig. 3A) includes at least a portion of one metal protection layer (146) located on a portion of the active surface of the semiconductor die. Doan does not disclose "a first passivation layer located on a portion of the one metal protection layer, and a second passivation layer located on a portion of the first passivation layer."

Kuo discloses a semiconductor die (100 of Fig. 1F) which includes a first passivation (192c) layer located on a portion of the one metal protection layer (150b, para [0028]), and a second passivation layer (192d) located on a portion of the first passivation layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a second passivation layer located on a portion of a first passivation layer located on a metal protection layer located on a die in the invention of Doan since it is desirable to eliminate moisture and static charge build up due to ambient interference.

Regarding claim 18, Doan discloses the limitations of claim 1. Doan does not disclose "wherein the semiconductor die includes at least a portion of more than one

metal protection layer located on a portion of the active surface of the semiconductor die, a first passivation layer located on a portion on the metal protection layer, and a plurality of passivation layers located on at least a portion of the first passivation layer."

Kuo discloses semiconductor die (100 of Fig. 1F) includes at least a portion of more than one metal protection layer (150a, 150b, para [0028], para [0033]) located on a portion of the active surface of the semiconductor die, a first passivation layer located on a portion on the metal protection layer, and a plurality of passivation layers (para [0033]) located on at least a portion of the first passivation layer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include more than one metal protection layer located on a portion of the active surface of the semiconductor die in the invention of Doan since it is well known in the art that multiple metal layers are required in an under bump metallization layer, specifically at least one metal layer is required to be used as an adhesion layer and at least one metal layer is required for a barrier layer.

Moreover, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a plurality of passivation layers located on a portion of a first passivation layer located on a portion of a metal protection layer a die in the invention of Doan since it is desirable to eliminate moisture and static charge build up due to ambient interference.

Regarding claim 37, Doan discloses the limitations of claim 22. Doan does not disclose "wherein the semiconductor die includes a first passivation layer located on a portion thereof and a second passivation layer located on a portion of the first

passivation layer." Kuo discloses a semiconductor die (100 of Fig. 1F, for example) which includes a first passivation layer (192c) located on a portion thereof and a second passivation layer (192d) located on a portion of the first passivation layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a second passivation layer located on a portion of a first passivation layer located on a die in the invention of Doan since it is desirable to eliminate moisture and static charge build up due to ambient interference.

Regarding claim 38, Doan discloses the limitations of claim 22, wherein the semiconductor die (Fig. 3A) includes at least a portion of one metal protection layer (146) located on a portion of the active surface of the semiconductor die. Doan does not disclose "a first passivation layer located on a portion of the one metal protection layer, and a second passivation layer located on a portion of the first passivation layer." Kuo discloses a semiconductor die (100 of Fig. 1F) which includes a first passivation (192c) layer located on a portion of the one metal protection layer (150b, para [0028]), and a plurality of passivation layers (para [0033]) located on a portion of the first passivation layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a plurality of passivation layers located on a portion of a first passivation layer located on a metal protection layer located on a die in the invention of Doan since it is desirable to eliminate moisture and static charge build up due to ambient interference.

Regarding claim 39, Doan discloses the limitations of claim 22. Doan does not disclose "wherein the semiconductor die includes at least a portion of more than one

metal protection layer located on a portion of the active surface of the semiconductor die, a first passivation layer located on a portion of the more than one metal protection layer, and a plurality of passivation layers located on at least a portion of the first passivation layer." Kuo discloses semiconductor die (100 of Fig. 1F) includes at least a portion of more than one metal protection layer (150a, 150b, para 10028), para [0033]) located on a portion of the active surface of the semiconductor die, a first passivation layer located on a portion on the metal protection layer, and a plurality of passivation layers (para [0033]) located on at least a portion of the first passivation layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include more than one metal protection layer located on a portion of the active surface of the semiconductor die in the invention of Doan since it is well known in the art that multiple metal layers are required in an under bump metallization layer, specifically at least one metal layer is required to be used as an adhesion layer and at least one metal layer is required for a barrier layer.

Moreover, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a plurality of passivation layers located on a portion of a first passivation layer located on a portion of a metal protection layer a die in the invention of Doan since it is desirable to eliminate moisture and static charge build up due to ambient interference.

Regarding claim 45, Doan discloses the limitations of claim 43. Doan does not disclose further comprising: applying a layer of material to passivate a portion of the area of metal." Kuo discloses applying a layer of material (140) to passivate a portion of

an area of metal (138, para [0026]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to passivate a portion of the area of metal in the invention of Doan since it is desirable to have a moisture barrier preventing oxidation of a portion of the area of metal.

Regarding claim 58, Doan discloses the limitations of claim 43. Doan does not disclose "wherein the semiconductor die includes a first passivation layer located on a portion thereof and a second passivation layer located on a portion of the first passivation layer." Kuo discloses a semiconductor die (100 of Fig. 1F) which includes a first passivation layer (192c) located on a portion thereof and a second passivation layer (192d) located on a portion of the first passivation layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a second passivation layer located on a portion of a first passivation layer located on a die in the invention of Doan since it is desirable to eliminate moisture and static charge build up due to ambient interference.

Regarding claim 59, Doan discloses the limitations of claim 43, wherein the semiconductor die (Fig. 3B) includes at least a portion of one metal protection layer (146) located on a portion of an active surface thereof. Doan does not disclose "a first passivation layer located on a portion of the one metal protection layer, and a second passivation layer located on a portion of the first passivation layer." Kuo discloses a semiconductor die (100 of Fig. 1F) which includes a first passivation (192c) layer located on a portion of the one metal protection layer (150b, para (0028)), and a plurality of passivation layers (para (0033)) located on a portion of the first passivation

layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a plurality of passivation layers located on a portion of a first passivation layer located on a metal protection layer located on a die in the invention of Doan since it is desirable to eliminate moisture and static charge build up due to ambient interference.

Regarding claim 60, Doan discloses the method of claim 43. Doan does not disclose "wherein the semiconductor die includes at least a portion of more than one metal protection layer located on a portion of an active surface thereof, a first passivation layer located on a portion of the more than one metal protection layer, and a plurality of passivation layers located on at least a portion of the first passivation layer." Kuo discloses semiconductor die (100 of Fig. 1F) includes at least a portion of more than one metal protection layer (150a, 150b, para [0028], para [0033]) located on a portion of the active surface of the semiconductor die, a first passivation layer located on a portion on the metal protection layer, and a plurality of passivation layers (para [0033]) located on at least a portion of the first passivation layer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include more than one metal protection layer located on a portion of the active surface of the semiconductor die in the invention of Doan since it is well known in the art that multiple metal layers are required in an under bump metallization layer, specifically at least one metal layer is required to be used as an adhesion layer and at least one metal layer is required for a barrier layer.

Moreover, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a plurality of passivation layers located on a portion of a first passivation layer located on a portion of a metal protection layer a die in the invention of Doan since it is desirable to eliminate moisture and static charge build up due to ambient interference.

Regarding claim 79, Doan discloses the limitations of claim 64. Doan does not disclose "wherein the semiconductor die includes a first passivation layer located on a portion thereof and a second passivation layer located on a portion of the first passivation layer." Kuo discloses a semiconductor die (100 of Fig. 1F) which includes a first passivation layer (192c) located on a portion thereof and a second passivation layer (192d) located on a portion of the first passivation layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a second passivation layer located on a portion of a first passivation layer located on a die in the invention of Doan since it is desirable to eliminate moisture and electrical static charge build up due to ambient interference.

Regarding claim 80, Doan discloses the limitations of claim 64, wherein the semiconductor die (Fig. 3B) includes at least a portion of one metal protection layer (146) located on a portion of the active surface thereof. Doan does not disclose "a first passivation layer located on a portion of the one metal protection layer, and a second passivation layer located on a portion of the first passivation layer."

Kuo discloses a semiconductor die (100 of Fig. 1F) which includes a first passivation (192c) layer located on a portion of the one metal protection layer (150b,

para [0028]), and a plurality of passivation layers (para [0033]) located on a portion of the first passivation layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a plurality of passivation layers located on a portion of a first passivation layer located on a metal protection layer located on a die in the invention of Doan since it is desirable to eliminate moisture and static charge build up due to ambient interference.

Regarding claim 81, Doan discloses the limitations of claim 64. Doan does not disclose "wherein the semiconductor die includes at least a portion of more than one metal protection layer located on a portion of the active surface thereof, a first passivation layer located on a portion of the more than one metal protection layer, and a plurality of passivation layers located on at least a portion of the first passivation layer."

Kuo discloses semiconductor die (100 of Fig. 1F) includes at least a portion of more than one metal protection layer (150a, 150b, para [0028], para [0033]) located on a portion of the active surface of the semiconductor die, a first passivation layer located on a portion on the metal protection layer, and a plurality of passivation layers (para [0033]) located on at least a portion of the first passivation layer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include more than one metal protection layer located on a portion of the active surface of the semiconductor die in the invention of Doan since it is well known in the art that multiple metal layers are required in an under bump metallization layer, specifically at least one metal layer is required to be used as an adhesion layer and at least one metal layer is required for a barrier layer.

Moreover, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a plurality of passivation layers located on a portion of a first passivation layer located on a portion of a metal protection layer a die in the invention of Doan since it is desirable to eliminate moisture and static charge build up due to ambient interference.

Response to Amendment

In the Amendment filed June 6, 2006, applicant's sole argument against "the Doan reference is [it] is not prior art under 35 U.S.C. 102(a) to the claimed invention." This is noted, however, the Doan reference continues to be prior art under 35 U.S.C. 102, specifically, section (e). Since applicant fails to point out any error in the rejection or state any difference between Doan and the claimed invention, the rejection is maintained. Furthermore, this change is not and cannot be considered a new grounds of rejection since it maintains the anticipatory-type rejection.

Applicant's arguments against Fang are not deemed to be persuasive since applicant merely recites substantial sections of each of the independent claims and then "assert[s] that the Fang reference contains no description whatsoever of any such elements of the claimed invention." According to 37 C.F.R. 1.111(b), a "general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references does not comply with the requirements of this section." Nevertheless, the explanation stated for each of the rejections clearly point out how the claimed invention reads on Fang and

Doan, and/or how certain limitations are being treated in the Office action. That is, as stated in the body of the rejections, the structural aspect of "placing the at least one bond pad on a portion of the inactive surface of the semiconductor die distributing the forces therearound" is disclosed by Fang and Doan, the remaining language is considered intentional or functional in scope, hence, fails to structurally or patentably distinguish the claims from the prior art.

Applicant's argument against the obviousness-type rejection over Fang in view of Doan is not deemed to be persuasive since Doan is prior art under section (e) of 35 U.S.C. 102, as explained above.

Applicant's argument against the obviousness-type rejection over Fang in view of Chu et al. is not deemed to be persuasive since Chu is prior art under section (e) of 35 U.S.C. 102, where Chu et al.'s application filing date is Oct. 9, 2003. Likewise, the filing date of Kuo et al. is December 8, 2003, thus, prior art under 35 U.S.C. 102(e).

Therefore, all the rejections are maintained.

Conclusion

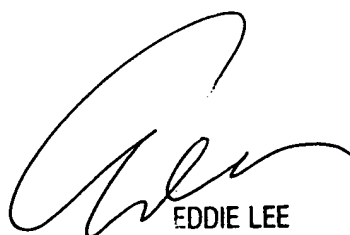
THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication should be directed to Eddie C. Lee at telephone number 571-272-1732.



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800